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ing period the two gonameres fuse a fusion of their nucleoli also occurs.

With regard to the fate of the maternal and paternal halves during maturation the author says that there are three possibilities; Either (1) a complete separation of the halves (Mendel's principle), (2) a symmetrical mixing of nuclear constituents, or (3) an unsymmetrical mixing. He concludes that the first maturation is an equational division and that the reduction occurs in the second maturation in such a manner "that the ripe egg cell contains one half of the grand paternal and one half of the grand maternal chromosomes" thus fulfilling the second possibility named above.

The conclusion which the author reaches that the reduction is brought about by a fusion of maternal and paternal chromosomes at the time of the 2d maturation division is not sufficiently well supported, especially in view of the fact that recent work, particularly that of Montgomery and of Sutton, has shown that this fusion occurs at a period long preceding the first maturation.

BOTANY.

Notes. — The *Botanical Gazette* for January contains the following articles:— J. D. Smith, "Undescribed Plants from Guatemala and Other Central American Republics, XXIV"; Arthur, "Cultures of Uredineæ in 1902"; Dean, "Experimental Studies on Inulase"; Livingston, "The Distribution of the Upland Plant Societies of Kent County, Michigan"; and Schneider, "Contributions to the Biology of Rhizobia."

The *Bulletin of the Torrey Botanical Club* for January contains the following articles: — Arthur, "Problems in the Study of Plant Rusts"; Evans, "Hepaticæ of Puerto Rico — II. *Drepano-lejeunea*"; Underwood, "An Index to the Described Species of Botrychium"; and Kellerman, "The Effects of Various Chemical Agents upon the Starch-converting Power of Taka Diastase.

Floral Life is the title of a new journal which begins in January, its first number being also noted as "Old Series No. 139," it being a continuation of *Meehan's Monthly*.

The *Plant World* for December, with a portrait of F. H. Knowlton as frontispiece, contains the following articles:—Niles, "Origin of Plant Names—IV; Parish, San Jacinto Mountain"; Wallace, "The Preservation of our Wild Flowers, Shrubs and Trees"; Williams, "Where Lichens grow"; Knowlton, "Fossil Mosses"; and Pollard, "Cocoanuts in Cuba." As a supplement to this number,—the title page, etc., of Mr. Pollard's *The Families of Flowering Plants*.

Rhodora for January contains the following articles:—Collins, "North American Ulvaceæ"; Bissell, "A Botanical Trip to Salisbury, Ct."; Knowlton, "Flora of Mt. Saddleback, Me."; Leavitt, "Outgrowths on the Leaf of *Aristolochia*"; Pease, "*Erodium malacoides* at Lawrence, Mass."; Bissell, "*Lycopodium clavatum* and its variety"; and Graves, "*Schwalbea Americana* in Ct."

An article on "The Functional Inertia of Plant Protoplasm," by Robertson, is published in Vol. III, No. 3, of the *Proceedings of the Scottish Microscopical Society*.

"Plant Physiology for the High School," by Ganong, and "High School botany," by Syndam, are articles in *School Science* for February.

A fossil flora of the John Day Basin, Oregon, constitutes *Bulletin No. 204* of the U. S. Geological Survey.

From the structure of their seedlings, Miss Sargent argues, in the *Annals of Botany* for January, that the monocotyledons are derivatives of dicotyledons, rather than the reverse.

The anatomy of *Macrozamia heteromera* is written on by Agnes Robertson in Vol. XII, part 1 of the *Proceedings of the Cambridge Philosophical Society*.

In No. 8 and 9 of the *Pharmaceutical Archives* for 1902, Per-rédès and Power respectively discuss the anatomy and the chemistry of *Derris uliginosa*,—an Eastern fish poison; No. 1 of *The Pharmaceutical Archives* for 1903, also, containing the conclusion of Dr. Power's paper.

Chrysanthemum indicum, one of the original sources of the many cultivated "Chrysanthemums," is figured, accompanied by a note by Sir Joseph Hooker, in *Curtis's Botanical Magazine* for January.

"Growing Cuban tobacco in the United States" forms the subject of an illustrated article by Marrion Wilcox, in *The World's Work* for February.

Part 4 of Arthur and Holway's "Descriptions of American Uredineæ" is published, with line illustrations, in Vol. V, no. 3 of the *Bulletin* from the Laboratories of Natural History of the State University of Iowa, dated in October. It may not be known generally that the exsiccatae of the same authors are further illustrated by excellent photographic representations of the species distributed.

Torreya for January contains: Gleason, "Notes on Some Southern Illinois Plants"; Watterson, "Louise Brisbin Dunn"; Lloyd, "Vacation Observations — III"; Grout, "Leaves of the Skunk Cabbage"; Murrill, "A New Family of the Basidiomycetes" (Xylophagaceæ, based on Xylophagus and allied genera); Cockerell, "A New Oak — *Quercus rydbergiana*"; and Berry, "Insect Visitors of *Scrophularia leporella*."

The 1902 *Bericht der Senckenbergischen Naturforschenden Gesellschaft* contains lectures by Möbius on carnivorous plants, Askenasy on the phenomena of swelling, and Kinkelin on the development of the plant world with reference to recent fossil collections.

An article on Droseras, in which several species are figured, is published in *Die Gartenwelt* of January 10th.

Additional observations on The Strand Flora of New Jersey, by Harshberger, have been separately issued from the *Proceedings of the Academy of Natural Sciences of Philadelphia*, for October, under date of December 12th.

Part 16 of J. M. Macoun's "Contributions to Canadian Botany" is published in *The Ottawa Naturalist* for February.

A flora of the town of Southington, Conn., and its vicinity, by Bissell and Andrews, has been published as Connecticut School Document No. 15, issued by the State Board of Education in 1902.

A short article on Santo Domingo, by Harshberger, has been reprinted from *Education* of January.

Ginseng culture is the subject of *Bulletin No. 62* of the Pennsylvania Agricultural Experiment Station.

"How to grow a Forest from Seed" is the title of *Bulletin No. 95* of the New Hampshire Agricultural Experiment Station.

A well illustrated article on "The Mango in Porto Rico," by G. N. Collins, is published as *Bulletin No. 28* of the Bureau of Plant Industry of the Department of Agriculture.

Arboriculture for January is largely devoted to the hardy Catalpa, *C. speciosa*.

Country life in America, for February, contains among other interesting things an article on the orange in Florida, by Webber, and one on orange growing in California, by Holder.

A well illustrated popular article on the date palm, by Sajo, is contained in *Prometheus* for January.

A list of American varieties of vegetables for the years 1901 and 1902, by W. W. Tracy, Jr., is published as *Bulletin No. 21* of the Bureau of Plant Industry of the Department of Agriculture, and forms a closely printed pamphlet of 402 pages.

No. 1 of Vol. VIII of the *Anales del Museo Nacional de Buenos Aires* contains Nos. 51 to 190 of Spegazzini's "Mycetes Argentinenses," the signatures of which are dated July 16, 1902.

The Gardener's Chronicle of January 24 contains a portrait and short obituary of Wendland.

The *Botanical Gazette* for March contains the following articles: Thaxter, "New or peculiar North American Hyphomycetes, III"; Copeland, "Chemical Stimulation and the Evolution of Carbon Dioxid (concluded)"; Coulter and Chamberlain, "The Embryology of *Zamia*"; Fink, "Some Talus *Cladonia* Formations"; Reed, "Development of the Macrosporangium of *Yucca filamentosa*"; Greenman, "Faxonanthus"; and Hitchcock, "Notes on North American grasses."

The Bulletin of the Torrey Botanical Club for March contains the following articles: Cannon, "Studies in plant hybrids—The spermatogenesis of hybrid cotton"; Britton, "Timothy Field Allen" (with portrait); Vail, "Studies in the Asclepiadaceæ, VII. A new species of *Vincetoxicum* from Alabama"; and Piper, "A new species of *Waldsteinia* from Idaho."

The American Botanist for March contains the following popular articles: C. F. Saunders, "Early spring in southern California"; Turnbull, "Concerning nomenclature"; and Gøtting, "A rare perfume."

The first *Yearbook of the Carnegie Institution of Washington*, recently issued, contains much interesting information concerning the botanical work being planned, later details of which are noted in recent issues of *Science*.

The "Osservazioni scientifiche eseguite durante la spedizione polare di S. A. R. Luigi Amadeo di Savoia," Milan, 1903, contains among other things, chapters on phanerogams by Belli and cryptogams by Mattiolo.

The Flora of Tropical Africa, edited by Sir W. T. Thiselton-Dyer, has reached No. 3 of Vol. IV, comprising Asclepiadeæ, in part, to Gentianeæ, in part.

A developmental account of African Park-lands, by Professor Tansley, with illustrations, appears in *The New Phytologist* of February 16.

Contributions to Western Botany, No. 11, of Marcus E. Jones issued April 10, 1903, is largely occupied with *Abronia*, *Oxytheca*, *Eriogonum* and *Atriplex*.

An account of the pine-woods of Florida, by Leplæ, appears in recent numbers of the *Bulletin de la Société Centrale Forestière de Belgique*.

The question as to what constitutes an "annual" is discussed by Praeger in the *Irish Naturalist* for April.

A new Lower-Californian palm, *Erythea brandegeei*, is described and figured by Purpus in *Gartenflora*, Vol. LII.

A number of new Mexican grasses are described by Hackel in the opening number of Vol. XVII of the *Annalen des K. K. Naturhistorischen Hofmuseums* of Vienna.

The Ottawa Naturalist for April contains a paper by Evans on Yukon Hepaticæ.

The Bryologist for March contains the following articles: Fink and Husband, "Notes on Certain Cladonias"; Barbour, "Hepatics *Lejeunea*"; Holzinger, "Karl Gustave Limpricht (part 2)"; Holzinger, "Some notes on collecting"; Grout, "*Pogonatum brevicaule*"; Williams, "*Psilopilum tschutschicum*;" and Nicholson, "*Mnium insigne*."

Separates of Dr. Galloway's vice-presidential address at the Pittsburg meeting of the American Association for the advancement of Science, on applied botany, retrospective and prospective, have been distributed recently.

An economic study of Sequoia, published as *Bulletin No. 38* of the Bureau of Forestry of the United States Department of Agriculture, contains the following chapters:—Fisher, "A study of the redwood";

von Schrenk, "The brown rot Disease of the Redwood"; and Hopkins, "Insect Enemies of the Redwood."

Data on the self-fertility of the grape, comprising studies of the potency of the pollen of self-sterile grapes, the influence on self-fertility of girdling or bending the canes, and the pollen of the grape, are published by Beach and Booth in *Bulletins No. 223-4* of the New York Agricultural Experiment Station.

An exhaustive study of the injury of plants by smoke and gases, by Haselhoff and Lindau, has been issued from the press of Bornträger Brothers, of Leipzig.

An account of *Polyporus fraxinophilus* and its effects on the white ash, by von Schrenk, constitutes *Bulletin No. 32* of the Bureau of Plant Industry of the Department of Agriculture.

Professor Arthur's Washington address as President of the Botanical Society of America, on problems in the study of plant rusts, has been distributed by the secretary of the society.

The relation between frost-injury and parasitic infection in cereals is discussed by Sorauer in *Landwirtschaftliche Jahrbücher*, Vol. XXXII, Heft 1, issued in March.

Among the complicated series and sub-series of University Bulletins that have appeared in recent years as a means of securing periodical mailing privileges, is to be noted an *Ohio Mycological Bulletin*, forming part of the botanical series of the bulletins of the university of that state.

The *Journal of Mycology* for February, with portrait of Dr. Farlow as frontispiece, contains the following articles: Bubak, "Zwei neue Pilze aus Ohio"; Morgan, "*Lepidoderma geaster*"; Kellerman, "A new species of *Cephalosporium*"; Kellerman, "Uredineous infection experiments in 1902"; Stevens, "Notes on *Sclerospora graminicola*"; Atkinson, "A new species of *Calostoma*"; Kellerman, "Ohio Fungi, fascicle VI, [labels and notes]"; Kellerman, "Index to North American Mycology"; and Kellerman, "Notes from mycological literature, IV."

The petiolar nectar glands of *Viburnum*, which form the subject of a paper by Thouvenin in No. 171 of the *Revue Générale de Botanique*, are homologized with leaflets of a compound leaf.

An interesting account of variations in the occurrence of salicin

and salinigrin in different willow and poplar barks, by Jowett and Potter, is issued as No. 28 of the publications of *The Wellcome Chemical Research Laboratories*.

The *Berichte der Deutschen Botanischen Gesellschaft* of March 25, 1903, includes a paper by Rosenberg on the chromosomes of a *Drosera* hybrid, and a paper by Correns on the dominating characteristics of hybrids.

From a statement by the Director in *Bulletin du Jardin Impériale Botanique de St. Pétersbourg*, Vol. III, Livraison 1, it appears that 35,358 persons visited the extensive plant-houses of that great establishment in 1902, the yearly average for the past thirty years being 20,655.

The concluding number of Vol. II of the *Bulletin of the New York Botanical Garden*, issued in March, shows the incorporation of about 90,000 herbarium specimens, the addition of 1962 bound volumes to the library, and the increase of species of plants cultivated in the Garden to about 10,600, for 1902.

An account of the Glasgow Botanical Garden is contained in *The Gardeners' Chronicle* of February 28.

In the recently commenced *Bulletin du Jardin Botanique de l'Etat à Bruxelles*, Professor Massart discusses the problem of gardens for the class purposes of secondary schools, and gives a list of 72 desirable species, including one Fungus, one Alga, four Bryophytes, and three Pteridophytes, with instructions for the more difficult phases of the gardening.

Country Life in America for March is a gardening issue, adequately illustrated.